

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (currently amended) A method of operating an electrolyzer system having an electrolyzer comprising a container housing a first side which is one of an anode side wherein an oxygen-containing stream is produced and a cathode side wherein a hydrogen-containing stream is produced and a second side which is the other of the anode side and the cathode side, the container being disposed in an interior cavity of a pressure vessel, the method comprising:

~~[[a]] positioning the container in an interior cavity of a pressure vessel;~~

[[b]] pressurizing ~~water in said~~ the interior cavity of ~~[[said]]~~ the pressure vessel to thousands of pounds per square inch with pressurized water from a pressurized water source;

[[c]] supplying said pressurized water to the first and second sides within the container;

[[d]] supplying electrical current to the electrolyzer; and

[[e]] producing the hydrogen-containing stream in the cathode side and the oxygen-containing stream in the anode side from said current and said pressurized water.

2. (currently amended) The method of claim 1, further comprising:

[[f]] routing a first side stream produced in the first side out of said pressure vessel; and

[[g]] routing a second side stream produced in the second side into said interior cavity.

3. (currently amended) The method of claim 2, wherein routing said first side stream further comprises selectively allowing said first side stream to be routed out of [[said]]the pressure vessel with a valve.

4. (original) The method of claim 3, further comprising regulating a pressure of said first side stream with said valve.

5. (currently amended) The method of claim 2, wherein routing said first side stream further comprises routing said first side stream to a separator and the method further comprises:

[[h]] separating said first side stream into at least a gas and liquid water;

[[i]] selectively routing said liquid water from said separator to [[said]]the interior cavity; and

[[j]] selectively routing said gas from said separator to a downstream component of the electrolyzer system.

6. (original) The method of claim 5, wherein said downstream component accumulates said separated gas and said pressurized water is at least partially pressurized by back pressure of said accumulated gas.

7. (original) The method of claim 2, wherein the first side is the cathode side, said first side stream is the hydrogen-containing stream, the second side is the anode side, and said second side stream is the oxygen-containing stream.

8. (currently amended) The method of claim 2, wherein ~~said water~~ the interior cavity is at least partially pressurized by evolved gas in said second side stream being selectively retained in ~~[[said]]~~ the interior cavity of ~~[[said]]~~ the vessel.

9. (currently amended) The method of claim 1, wherein said pressurizing ~~water in said~~ includes pressurizing the interior cavity ~~comprises pressurizing said with~~ said pressurized water ~~in said interior cavity~~ to greater than about 5,000 psi.

10. (currently amended) The method of claim 9, wherein said pressurizing ~~water in said~~ includes pressurizing the interior cavity ~~comprises pressurizing said with~~ said pressurized water ~~in said interior cavity~~ to greater than about 10,000 psi.

11. (currently amended) The method of claim 1, wherein ~~said water is pressurized by~~ pressurizing includes supplying said pressurized water from a high pressure water pump.

12. (currently amended) The method of claim 1, wherein said supplying said pressurized water ~~to the first and second sides comprises~~ includes pumping said pressurized water to the first and second sides with a pump located in ~~[[said]]~~ the interior cavity.

13. (currently amended) The method of claim 1, wherein said supplying said pressurized water ~~to both of the sides of the electrolyzer further comprises~~ includes controlling a rate at which said pressurized water is supplied to at least one of the sides.

14. (currently amended) The method of claim 1, further comprising monitoring a level of ~~[[said]]~~ the pressurized water in said interior cavity and selectively supplying pressurized water to ~~[[said]]~~ the interior cavity based on said level of said pressurized water in ~~[[said]]~~ the interior cavity.

15. (currently amended) The method of claim 1, further comprising monitoring a pressure in ~~[[said]]~~ the interior cavity and wherein pressurizing ~~water in said the interior cavity~~ further comprises ~~pressurizing said~~ supplying said pressurized water based on said pressure in ~~[[said]]~~ the interior cavity

16. (currently amended) The method of claim 1, further comprising selectively venting a gas in ~~[[said]]~~ the interior cavity out of ~~[[said]]~~ the pressure vessel.

17. (original) The method of claim 1, further comprising maintaining a pressure difference between the anode and cathode sides of the electrolyzer to less than about 2,000 psi.

18. (original) The method of claim 1, wherein the container is submerged in said pressurized water.

19. (currently amended) An electrolyzer system comprising:

- a pressure vessel having an interior cavity;
- an electrolyzer having a first side which is one of an anode side and a cathode side and a second side which is the other of said anode and cathode sides, said electrolyzer operable to convert water and electricity into a hydrogen-containing stream on said cathode side and an oxygen-containing stream on said anode side, said electrolyzer located in said interior cavity of said pressure vessel;
- a pressurized water source operable to selectively supply pressurized water at thousands of pounds per square inch;
- a flow path from said pressurized water source to said interior cavity of said pressure vessel, said interior cavity receiving pressurized water from said pressurized water source via said flow path and said pressurized water pressurizing said interior cavity of said pressure vessel to thousands of pounds per square inch; and
- wherein said pressurized water in said interior cavity of said pressure vessel is supplied to both sides of said electrolyzer and said electrolyzer uses said pressurized water along with an electrical current to produce said hydrogen-containing stream and said oxygen-containing stream.

20. (original) The system of claim 19, wherein each side of said electrolyzer has an inlet and an outlet, each inlet receiving said pressurized water from said interior cavity, side first side outlet being connected to a flow path that routes a first side stream out of said pressure vessel, and said second side outlet routing a second side stream into said interior cavity.

21. (original) The system of claim 20, further comprising a valve in said flow path from said first side outlet, said valve selectively allowing said first side stream to flow from said first side through said flow path out of said pressure vessel.

22. (original) The system of claim 21, wherein said valve regulates a pressure of said first side stream.

23. (original) The system of claim 21, further comprising a separator located in said flow path between said first side outlet and said valve, said separator separating said first side stream into at least a gas and liquid water, said separator having a first outlet through which said gas flows and a second outlet through which said liquid water flows, and said second outlet is connected to a flow path that directs said liquid water into said interior cavity of said pressure vessel.

24. (original) The system of claim 19, further comprising a pump located in said interior cavity of said pressure vessel, said pump having an inlet communicating with said pressurized water in said interior cavity, an outlet communicating with inlets on each side of said electrolyzer, and said pump selectively supplies said pressurized water in said interior cavity to each side of said electrolyzer.

25. (original) The system of claim 19, wherein said source of pressurized water is a high pressure water pump.

26. (original) The system of claim 19, wherein said first side is said cathode side and said second side is said anode side.

27. (original) The system of claim 19, wherein said pressurized water supplied to at least one side of said electrolyzer is regulated.

28. (original) The system of claim 19, further comprising a level indicator indicating a level of said pressurized water in said interior cavity and wherein said pressurized water source selectively supplies said pressurized water based on said level of said pressurized water.

29. (original) The system of claim 19, further comprising a pressure indicator indicating a pressure in said interior cavity and wherein said pressurized water source selectively supplies said pressurized water based on said pressure in said interior cavity.

30. (original) The system of claim 19, further comprising:
a flow path from an upper portion of said interior cavity out of said pressure vessel through which gas in said upper portion can flow; and
a valve in said flow path from said upper portion, said valve selectively allowing said gas to flow through said flow path and out of said pressure vessel.

31. (currently amended) The system of claim ~~[[19]]~~30, wherein said valve and said source of pressurized water control a pressure in said interior cavity.

32. (original) The system of claim 19, wherein said interior cavity is pressurized to greater than about 5,000 psi.

33. (original) The system of claim 19, wherein said interior cavity is pressurized to greater than about 10,000 psi.

34. (original) The system of claim 19, wherein a pressure difference between said anode and cathode sides is less than about 2,000 psi.

35. (original) The system of claim 19, wherein said electrolyzer is submerged in said pressurized water in said interior cavity.

36. (currently amended) A method of operating an electrolyzer system having an electrolyzer with a first side which is one of an anode side wherein an oxygen-containing stream is produced and a cathode side wherein a hydrogen-containing stream is produced and a second side which is the other of the anode said and the cathode side, the method comprising:

- (a) positioning the electrolyzer in an interior cavity of a pressure vessel;
- (b) pressurizing said interior cavity of said pressure vessel with pressurized water from a pressurized water source;
- (c) supplying said pressurized water in said interior cavity to the first and second sides of the electrolyzer;
- (d) supplying an electrical current to the electrolyzer;
- (e) producing the hydrogen-containing stream in the cathode side and the oxygen-containing stream in the anode side from said current and said water; and
- (f) regulating a pressure in the first side of the electrolyzer by selectively venting a first side stream produced in the first side of the electrolyzer out of said pressure vessel and into a pressurized storage device through a closed-loop regulator that compares said pressure in the first side of the electrolyzer with said pressure in said storage device.

37. (original) The method of claim 36, further comprising:
routing said first side stream to a separator;
separating said first side stream into liquid water and a gas; and
wherein regulating said pressure in the first side further comprises
selectively venting said gas in said separator to said pressurized storage device.

38. (original) The method of claim 37, further comprising selectively routing
said liquid water in said separator to said interior cavity of said pressure vessel.

39. (original) The method of claim 36, further comprising:
selectively supplying pressurized water to said interior cavity of said
pressure vessel;
pressurizing said interior cavity of said pressure vessel with said
pressurized water; and
wherein supplying water to the first and second sides of the electrolyzer
comprises supplying said pressurized water in said interior cavity of said pressure
vessel to the first and second sides of the electrolyzer.

40-42. (cancelled)

43. (new) The method of claim 4, wherein said routing said first side stream includes routing said first side stream into a pressurized storage device and said regulating includes regulating said pressure of said first side stream with a closed-loop regulator that compares said pressure of the first side of the electrolyzer with a pressure in said pressurized storage device.

44. (new) The system of claim 22, further comprising a pressurized storage device to which said flow path leads and wherein said valve is a closed-loop regulator that regulates said pressure of said first side stream by selectively allowing said first side stream to flow into said pressurized storage device through said closed-loop regulator by comparing said pressure in said first side of said electrolyzer with a pressure in said pressurized storage device.

45. (new) An electrolyzer system comprising:

a pressure vessel having an interior cavity;

an electrolyzer having a first side which is one of an anode side and a cathode side and a second side which is the other of said anode and cathode sides, said electrolyzer operable to convert water and electricity into a hydrogen-containing stream on said cathode side and an oxygen-containing stream on said anode side, said electrolyzer located in said interior cavity of said pressure vessel;

a pressurized water source operable to selectively supply pressurized water at a pressure greater than about 1,000 psi;

a flow path from said pressurized water source to said interior cavity of said pressure vessel, said interior cavity receiving pressurized water from said pressurized water source via said flow path and said pressurized water pressurizing said interior cavity of said pressure vessel to greater than about 1,000 psi; and

wherein said pressurized water in said interior cavity of said pressure vessel is supplied to both sides of said electrolyzer and said electrolyzer uses said pressurized water along with an electrical current to produce said hydrogen-containing stream and said oxygen-containing stream.